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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/659,529	09/09/2003	Ronald J. Graham	375461-007US	4786

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EXAMINER	
LEE, JAE W	
ART UNIT	PAPER NUMBER
1656	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/29/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/659,529	GRAHAM ET AL.	
	Examiner	Art Unit	
	Jae W. Lee	1656	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 November 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-55* is/are pending in the application.

4a) Of the above claim(s) *28,29,31 and 32* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27,30,33 and 34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *06/06/2006, 04/04/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Application status

Claims 1-55 are pending in this application.

Preliminary amendments for specification, filed on 03/22/2004 and 05/01/2006, and claims, filed on 12/19/2005, are acknowledged.

Priority

A claim of priority to the U.S. Provisional Application No. 60/409,178, filed on 09/09/2002, and U.S. Provisional Application No. 60/486,393, filed on 07/10/2003, is acknowledged.

Election

Applicant's election without traverse of Group I, Claims 1-34, the substrate compound in which the hydrophobic moiety, the fluorescent moiety and the enzyme recognition moiety are linked to one another via a trivalent linker as recited in claim 30, and SEQ ID NO: 1, is acknowledged. The Applicant's request of clarification of the subclass designation for Group I is acknowledged. The subclass classification of Group I is 345.

Claims 28, 29, 31 and 32 are withdrawn from further consideration by the Examiner, 37 CFR 1.142(b) as being drawn to a non-elected invention.

Therefore, Claims 1-27, 30, 33 and 34 will be examined on the merits.

Drawings

The drawings are objected to because Fig. 7B is missing labels for Y-axis and X-axis. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

Claims 4-6 and 22 are objected to because of the following informalities:

Claim 4 is objected to because the recitation of "reside" is misspelled. The Examiner suggests the following phrase, --- residue ---, to the extent that it is Applicant's intent.

Claims 5 and 6 are objected to because the recitation of "TK", "AGC", "CAMK", "CMGC", "STE", "TKL", "CKI", "Src", "Lyn", "Fyn", "Akt", "MAP" and "MAPKAP2" should be in parenthesis and follow the phrase it abbreviates when used for the first time.

Appropriate correction is required.

Claim Rejections - 35 U.S.C. § 112

The following is a quotation of the second paragraph of 35 U.S.C. § 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1 and 5 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the phrase, "enzyme recognition moiety," which is unclear. It is unclear with respect to what Applicants intend as being encompassed by the phrase.

Claim 5 recites the phrase, "to the group "other"," which is unclear. It is unclear with respect to what Applicants mean by the phrase.

The following is a quotation of the first paragraph of 35 U.S.C. § 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact

terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-27, 30, 33 and 34 are rejected under 35 U.S.C. § 112, first paragraph, written description, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 1-27, 30, 33 and 34 are directed to any substrate compound comprising any hydrophobic moiety capable of integrating the compound into a micelle, any fluorescent moiety, and any enzyme recognition moiety.

To satisfy the written description aspect of 35 U.S.C. § 112, first paragraph, for a claimed genus of [compositions or methods], it must be clear that: (1) the identifying characteristics of the claimed [compositions or methods] have been disclosed, e.g., structure, physical and/or chemical characteristics, functional characteristics when coupled with a known or disclosed correlation between function and structure, or a combination of these; and (2) a representative number of species within the genus must be disclosed.

The specification discloses an example of substrate compounds (see Scheme 3) having different length alkylacyl groups prepared in both phosphorylated and unphosphorylated form, represented by the following formula: **X**-Y**(Dye)**L**RRASL**G-NH_2, wherein **X is a fatty acid acyl group** of the form $CH_3(CH_2)_xC(=O)$-, x is 0, 7, 10, or 14, Y is alpha-aminomethyl glycine, **Dye is a 4,7-dichlorofluorescein dye** attached to the

2-amine nitrogen atom of Y by a 5- carbonyl linkage to the pendant phenyl ring of the dye, wherein the **enzyme recognition moiety consisting of amino acid sequence RRASL** capable of being phosphorylated by **Protein Kinase A** (see also pg. 44, paragraph [0147] and Example 3 in the specification). However, this is an inadequate written description for any substrate compound comprising any hydrophobic moiety capable of integrating the compound into a micelle, any fluorescent moiety, and any enzyme recognition moiety.

Further, the specification does not provide a disclosure of any particular structure to function/activity relationship in the claimed substrate compound comprising any hydrophobic moiety capable of integrating the compound into a micelle, any fluorescent moiety, and any enzyme recognition moiety. In addition, the specification fails to describe any identification of structural characteristics or properties of any hydrophobic moiety, any fluorescent moiety, any enzyme recognition moiety, and any protein kinase. Also, the specification discloses an example of the specific interaction between each moiety, wherein the hydrophobic moiety, the fluorescent moiety and the enzyme recognition moiety are linked to one another via a trivalent linker on pg. 44 in Scheme 3. However, this is an inadequate description for any substrate compound comprising any hydrophobic moiety capable of integrating the compound into a micelle, any fluorescent moiety, and any enzyme recognition moiety, wherein each moiety is joined to one another in an infinite number of different possible arrangements. Given the lack of additional representatives of any substrate compound comprising any hydrophobic moiety capable of integrating the compound into a micelle, any fluorescent moiety, and

any enzyme recognition moiety, Applicants have failed to sufficiently describe the claimed invention, in such full, clear, concise, and exact terms that a skilled artisan would recognize Applicants were in possession of the claimed invention.

Applicant is referred to the revised guidelines concerning compliance with the written description requirement of U.S.C. 112, first paragraph, published in the Official Gazette and also available at www.uspto.gov.

Claims 1-27, 30, 33 and 34 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement, because the specification, while being enabling for substrate compounds having different length alkylacyl groups prepared in both phosphorylated and unphosphorylated form, represented by the following formula: X-Y(Dye)LRRASLG-NH_2, wherein X is a fatty acid acyl group of the form $CH_3(CH_2)_xC(=O)$-, x is 0, 7, 10, or 14, Y is alpha-aminomethyl glycine, Dye is a 4,7-dichlorofluorescein dye attached to the 2-amine nitrogen atom of Y by a 5- carbonyl linkage to the pendant phenyl ring of the dye, wherein the enzyme recognition moiety consisting of amino acid sequence RRASL capable of being phosphorylated by Protein Kinase A, does not reasonably provide enablement for any substrate compound comprising any hydrophobic moiety capable of integrating the compound into a micelle, any fluorescent moiety, and any enzyme recognition moiety. Therefore, the specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims.

The factors to be considered in determining whether undue experimentation is required are summarized In re Wands 858 F.2d 731, 8 USPQ2nd 1400 (Fed. Cir, 1988). The Court in Wands states: "Enablement is not precluded by the necessity for some experimentation such as routine screening. However, experimentation needed to practice the invention must not be undue experimentation. The key word is 'undue,' not 'experimentation.' " (Wands, 8 USPQ2d 1404). Clearly, enablement of a claimed invention cannot be predicated on the basis of quantity of experimentation required to make or use the invention. "Whether undue experimentation is needed is not a single, simple factual determination, but rather is a conclusion reached by weighing many factual considerations." (Wands, 8 USPQ2d 1404). The factors to be considered in determining whether undue experimentation is required include: (1) the quantity of experimentation necessary, (2) the amount or direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims. While all of these factors are considered, a sufficient amount for a *prima facie* case is discussed below.

Claims 1-27, 30, 33 and 34 are so broad as to encompass any substrate compound comprising any hydrophobic moiety capable of integrating the compound into a micelle, any fluorescent moiety, and any enzyme recognition moiety.

The claims rejected under this section of U.S.C. 112, first paragraph, do not place any structural limits on the "substrate compound", "hydrophobic moiety", "fluorescent moiety", and "enzyme recognition moiety." Since the exact chemical

structure of different moieties of the substrate compound comprising an amino acid sequence of a peptide determines its structural and functional properties, predictability of which moieties and peptides can be used while obtaining the desired function requires a knowledge of and guidance with regard to which chemical structure and amino acids in the peptide's sequence, if any, are conserved (i.e. expectedly intolerant to modification), and detailed knowledge of the ways in which the chemical structure and peptide's structure relates to its desired function. In addition, the scope of the claims is not commensurate with the enablement provided by the disclosure with regard to the extremely large number of different chemical structures and peptide sequences. The specification, however, only discloses a single peptide, LRRASLG, in the specification on pg. 68-69.

While recombinant and mutagenesis techniques are known, it is not routine in the art to screen for multiple substitutions or multiple modifications, as encompassed by the instant claims, and the positions within a chemical structure, or a protein's sequence, where modifications can be made with a reasonable expectation of success in obtaining the desired activity/utility are limited in any chemical structure moieties comprising a peptide and the result of such modifications is unpredictable. In addition, one skilled in the art would expect any tolerance to modification for a given chemical moieties or peptides to diminish with each further and additional modification, e.g. multiple substitutions, additions, or deletions.

The specification does not support the broad scope of the claims which encompass all modifications and fragments of any substrate compound comprising any

hydrophobic moiety capable of integrating the compound into a micelle, any fluorescent moiety, and any enzyme recognition moiety because the specification does not establish: (A) regions of the different moieties' structure which may be modified without affecting the desired biological activity; (B) regions of the claimed enzyme recognition moieties or protein kinase recognition sequence which may be modified without affecting the desired biological activity; (C) the general tolerance of the claimed substrate compound to modification and extent of such tolerance; (D) a rational and predictable scheme for modifying any chemical structure of different moieties and amino acid residues of the enzyme recognition moieties or the protein kinase recognition sequence with an expectation of obtaining the desired biological function; (E) regions of the claimed substrate compounds which may be modified without affecting the ability to be phosphorylated by any protein kinase; (F) a rational and predictable scheme for modifying the claimed substrate compounds with an expectation of obtaining the desired biological function; (G) any substrate compound comprising any hydrophobic moiety capable of integrating the compound into a micelle, any fluorescent moiety, and any enzyme recognition moiety, wherein each moiety is joined to one another in an infinite number of different possible arrangements; and (H) the specification provides insufficient guidance as to which of the essentially infinite possible choices is likely to be successful.

Because of this lack of guidance, and the fact that the relationship between the claimed substrate compounds comprising any hydrophobic moiety capable of integrating the compound into a micelle, any fluorescent moiety, and any enzyme

recognition moiety, and its native conformation (i.e. its biological activity/function) is not well understood and unpredictable (e.g., see Ngo et al. in The Protein Folding Problem and Tertiary Structure Prediction, 1994, Merz et al. (ed.), Birkhauser, Boston, MA, pp. 433 and 492-495, Ref: U, Form-892), it would require undue experimentation for one skilled in the art to make and use any substrate compound comprising any hydrophobic moiety capable of integrating the compound into a micelle, any fluorescent moiety, and any enzyme recognition moiety, in which the enzyme recognition moiety comprises a protein kinase recognition sequence including any unphosphorylated residue capable of being phosphorylated by any protein kinase.

Claim Rejections - 35 U.S.C. § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-6, 8, 20, 21, 23, 27, 33 and 34 are rejected under 35 U.S.C. § 102(a) and 102(e) as being anticipated by Kramer et al. (USPN 7,049,080) because the

reference of Kramer et al. has the publication date of 07/04/2002 and the filing date of 08/07/2001 respectively.

The instant claims are drawn to a substrate compound comprising a hydrophobic moiety capable of integrating the compound into a micelle, a fluorescent moiety, and an enzyme recognition moiety.

Kramer et al. teach a process for detecting serine/threonine kinase activity. Kramer et al. specifically teach a TAMRA (6-carboxytetramethylrhodamine) labeled peptide (see column 8 under Example 1) with a sequence motif Z-X-Y, consisting of amino acid residues: KFMMTPYVVTR (see column 4 lines 18 and 19), wherein Z = serine or threonine, X = a sequence of preferably between 1 and 1000 amino acids which may be the same or different, and Y = tyrosine, serine or threonine, Y is capable of being phosphorylated (see columns 2 and 3). The peptide as taught by Kramer et al. comprises a hydrophobic moiety of TAMRA (6-carboxytetramethylrhodamine) (see attached structure and solubility in DMSO and methanol). Although the Kramer et al. does not specifically disclose the limitation of "hydrophobic moiety capable of integrating the compound into a micelle, it is an inherent property of a peptide comprising a hydrophobic moiety such as TAMRA (6-carboxytetramethylrhodamine) to be capable of integrating into a micelle such as a phospholipid bilayer of cellular membranes. Also, the peptide of Kramer et al. can be phosphorylated on Y residue by a MKK7 kinase as disclosed by small "p" shown in the peptide sequence: KFMMTP**pY**VVTR (see column 4 lines 18 and 19), thereby anticipating the claim limitation of enzyme recognition moiety. Further, although the Kramer et al. does not specifically disclose the limitation

of "fluorescent moiety", it is an intrinsic property of a peptide comprising KFMMTPYVVTR residues, which includes amino acid residues such as tryptophan, tyrosine, and phenylalanine to absorb wavelengths 280, 274, 257 respectively and to fluoresce at wavelengths 348, 303 and 282 nanometers respectively. Therefore, Kramer et al. anticipates Applicant's Claim 1, 4, 23, and 27. Claims 2, 8 and 34 are included in this rejection because an example of the enzyme recognition moiety, as taught by Kramer et al. in column 11, lines 35, is neutral upon phosphorylation on the threonine residue (KFMMTPYVVTR has 2+ from K and R, and phosphate group upon phosphorylation of Y will add 2-, therefore making the peptide neutral). Kramer et al. further teach that said enzyme recognition moiety is phosphorylated by a MAP kinase kinase, MKK7, in the Examples 4-9 in columns 9-14, thereby anticipating Claims 3, 5 and 6. Also, it is an inherent property of the Y-phosphorylated peptide to be dephosphorylated by a tyrosine phosphatase, therefore Claim 33 is also anticipated by Kramer et al. In addition, Claims 20 and 21 are included in this rejection because the hydrophobic moiety comprising TAMRA as taught by Kramer et al. contains a positively charged and a negatively charged group (see attached Invitrogen catalog showing the structure of TAMRA). Therefore, Kramer et al. anticipate Applicant's substrate compound comprising a hydrophobic moiety capable of integrating the compound into a micelle, a fluorescent moiety, and an enzyme recognition moiety, in which the enzyme recognition moiety comprises a protein kinase recognition sequence including an unphosphorylated residue capable of being phosphorylated by a protein kinase.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-27, 30, 33 and 34 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-12 and 15-33 of copending Application No. 11/035682, drawn to a substrate compound comprising two or more hydrophobic moieties capable of integrating the compound into a micelle, one or more fluorescent moiety(ies), an enzyme recognition moiety, wherein said hydrophobic moieties are located on opposite sides of said enzyme recognition moiety, which read on the Applicant's claims drawn to a substrate compound comprising a hydrophobic moiety capable of integrating the compound into a micelle, a fluorescent moiety, and an enzyme recognition moiety. Although the conflicting claims

are not identical, they are not patentably distinct from each other because both sets of claims are drawn to a substrate compound comprising hydrophobic moieties capable of integrating the compound into a micelle, a fluorescent moiety, an enzyme recognition moiety.

A timely filed terminal disclaimer in compliance with 37 C.F.R. § 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 C.F.R. § 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 C.F.R. § 3.73(b).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Conclusion

Claims 1-27, 30, 33 and 34 are rejected for the reasons as stated above. Applicants must respond to the objections/rejections in each of the numbered sections in this Office action to be fully responsive in prosecution.

The instant Office action is non-final.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jae W. Lee whose telephone number is 571-272-9949. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kathleen K. Bragdon can be reached on 571-272-0931. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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RICHARD HUTSON, PH.D.
PRIMARY EXAMINER